ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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Road Paving Asphalt

What is asphalt?
Asphalt is used for paving roads, parking lots and roofing. It consists of gravel, sand, and stone that is bound together by a cement-like substance derived from crude oil. Asphalt is sometimes confused with coal tar or pitch, which comes from coal. The ingredients used to make asphalt are mixed under high temperatures and kept heated until the asphalt is applied to a surface. Asphalt fumes are generated during the heating of the mixture. Petroleum hydrocarbons in the crude oil form a gas that condenses into fine particles as it cools, creating a particulate vapor.

What chemicals are in asphalt fumes?
The chemical composition of asphalt varies depending on the source of the crude oil, the type of asphalt being made, and the processes used to make it. In general, asphalt fumes are a mixture of several different types of compounds. These include:

- Volatile organic compounds (VOCs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Particulates
- Sulfur
- Nitrogen oxides
- Carbon monoxide

Many of these chemicals are also emitted by other sources including motor vehicles, fireplaces, woodstoves and industries. All of these chemicals are normally present at low levels in outdoor air. Elevated levels may be found in the immediate vicinity of an operating asphalt plant or a paving project.

What health effects are associated with exposure to asphalt fumes?
The health effects that can be caused by exposure to asphalt fumes depend on several factors:

- Duration of exposure
- Amount of exposure
- Individual sensitivity to chemical

Fumes created from heating asphalt can be inhaled into the lungs or can condense onto exposed areas of the skin. Workers in asphalt plants have the greatest exposure to asphalt fumes. Symptoms that workers have experienced include irritation of the nose, upper respiratory tract,

skin and eyes. Other symptoms include headache, fatigue, shortness of breath, wheezing, dizziness, and nausea. These symptoms result from short-term exposure to high levels of asphalt fumes and are reversible once exposure has stopped. Studies of asphalt workers have shown an association with high levels of asphalt fumes, long term exposure and an increased incidence of certain respiratory problems.

Residents living in the area of an asphalt road paving plant may detect odors from the plant. Odor detection depends on the emissions from the facility and the prevailing wind directions. Based on air sampling conducted near asphalt plants, residents may experience irritation from the odors associated with asphalt production but the potential for adverse health effects is very low. Children may be more sensitive than adults to certain chemicals. No studies have linked residential exposure to asphalt fumes with an increased risk of cancer.

Does living near an asphalt plant pose a health risk?
An asphalt plant must meet emissions criteria to receive an operating permit from the DES. If the permit criteria are met, emissions would not be expected to pose a public health hazard. Asphalt plant emissions may lead to odors in the community, but the potential for residents to experience adverse health effects is expected to be low. Asphalt plants, in general, do not present an elevated health risk to the surrounding community. This is especially true for asphalt plants that make road asphalt, since the emissions of carcinogens from these facilities are very low.

In the normal process of making hot mix asphalt, a small quantity of pollutants would be produced. Almost all of these pollutants would be released through the stack with a much smaller quantity being emitted from other sources associated with plant operations such as truck loading or conveyor belts. For example, a typical asphalt processing plant that makes 500 tons of hot mix asphalt per day would emit approximately 20 pounds per day of particulate matter through the stack and 0.05 pounds per day from other plant operations. Likewise, for a plant of this capacity, approximately 10 pounds per day of VOCs would be emitted through the stack with 0.5 pounds per day being released as the result of other plant operations.

Exposure investigations have been conducted in a number of communities throughout the country where asphalt paving plants have been operating. These studies have measured various pollutants in ambient (outdoor) air and found that the concentrations of VOCs, PAHs, hydrogen sulfide, and particulates are below levels that would represent a public health hazard to residents of those communities. A partial list of these exposure investigations is included at the end of this fact sheet for reference.

What does it mean if you can smell odors coming from a plant?
Odor sensitivity and response to odors differs from person to person. If you smell odors from an asphalt plant, they are not necessarily at levels that would cause adverse health effects. Many of the highly odorous chemicals in asphalt fumes can be smelled at levels below those expected to cause harmful effects; however, persistent odors may cause symptoms in some people. Sensitive individuals may experience health symptoms such as headache, dizziness or light-headedness. These symptoms are usually short term and reversible once the odors are no longer present. People should consult their health care providers if these symptoms persist.

For more information
For more information about asphalt emissions, please contact DES Air Resources Division at (603) 271-1370.

ATSDR (Agency for Toxic Substances and Disease Registry) 1999. Exposure Investigation for Mission Valley, San Diego, Calif. Nov. 4, 1999. US Department of Health and Human Services, Atlanta, Ga.

ATSDR 2001. Exposure Investigation for Staker Paving Asphalt Production Plant, Erda, Utah. May 17, 2001. US Department of Health and Human Services, Atlanta, Ga.

ATSDR 2003. Exposure Investigation for Brimhall Sand and Gravel, Indian Wells, Ariz. April 8, 2003. US Department of Health and Human Services, Atlanta, Ga. http://www.atsdr.cdc.gov/HAC/pha/PHA.asp?docid=906&pg=0

ATSDR 2005. Evaluation of Exposure from the Former Valley Asphalt Production Site Spanish Fork, Utah. December 8, 2005. US Department of Health and Human Services, Atlanta, Ga. http://www.atsdr.cdc.gov/HAC/pha/ValleyAsphaltProductionSite120805/ValleyAsphaltHC120805.pdf

ATSDR 2007. APAC Carolina Inc. and Associated Aspahlt Inc. Salisbury, N.C. February 14, 2007. US Department of Health and Human Services, Atlanta, Ga. http://www.atsdr.cdc.gov/HAC/pha/APACCarolinaIncandAssociatedAsphaltInc/APAC%20Carolina%20Inc.&%20Associated%20Asphalt%20Inc.%20HC%202-14-07.pdf